

CLAIMS

We claim:

1. A optical communication method in which interoperable optical frequencies are defined without an absolute frequency reference, the method comprising:
 - distributing non-absolute references identical in frequency to nodes of a
 - 5 network;
 - providing to the nodes respective tunable multi-channel devices, the tunable multi-channel devices having channels with mutually-identical frequency differences; and
 - at each of the nodes, frequency aligning one of the channels of the tunable
 - 10 multi-channel device thereat with the non-absolute frequency reference.
2. The method of claim 1, additionally comprising exchanging optical information signals between two or more of the nodes at a frequency aligned with another of the channels of the tunable multi-channel device.
3. The method of claim 1, in which the channels of the multi-channel device provided to at least some of the nodes differ in absolute frequency prior to the tuning.
4. The method of claim 1, additionally comprising:
 - at one of the nodes, frequency aligning a transmitter laser with another of the channels of the tunable multi-channel device thereat;
 - at another of the nodes, frequency aligning a receiver laser with the other of
 - 5 the channels of the tunable multi-channel device thereat; and
 - transmitting an optical information signal from the one of the nodes to the other of the nodes at the frequency aligned with the other of the channels of the tunable multi-channel devices.

5. The method of claim 4, in which the frequency aligning the transmitter laser comprises:
- frequency aligning the transmitter laser with the one of the channels of the tunable multi-channel device; and
- 5 re-aligning the transmitter laser in frequency with the other of the channels of the tunable multi-channel device.
6. The method of claim 5, in which the re-aligning comprises counting the number of channels between the one of the channels and the other of the channels.
7. The method of claim 1, in which the distributing comprises providing to the nodes non-absolute frequency reference artifacts defining an identical frequency.
8. The method of claim 1, in which the distributing comprises broadcasting a non-absolute frequency reference signal to the nodes.
9. An optical communication method in which interoperable optical frequencies are defined without an absolute frequency reference, the method comprising:
- providing a non-absolute frequency reference;
- 5 providing a tunable multi-channel device frequency alignable with the non-absolute frequency reference, the tunable multi-channel device having channels with stable, defined frequency differences; and
- transmitting optical information signals and/or receiving optical information signals at one or more frequencies each frequency aligned with a respective one of the
- 10 channels of the multi-channel device.
10. The method of claim 9, in which:
- the method additionally comprises generating non-absolute frequency reference signals frequency aligned with the channels of the tunable multi-channel device;
- 5 broadcasting the non-absolute frequency reference signals to the nodes; and

at each of the nodes:

receiving the non-absolute frequency reference signals, and
frequency aligning the one or more frequencies at which the optical
information signals are transmitted and/or received with respective ones of the
10 received non-absolute frequency reference signals.

11. The method of claim 9, additionally comprising:

locating the tunable multi-channel device at one of the nodes;
locating additional tunable multi-channel devices at remaining ones of the
nodes, the channels of all the tunable multi-channel devices having stable, mutually-
5 identical frequency differences;
distributing the non-absolute frequency reference to each of the nodes; and
at each of the nodes, frequency aligning one of the channels of the multi-
channel device thereat with the non-absolute frequency reference.

12. The method of claim 11, additionally comprising, at each of the nodes,
frequency aligning the one or more frequencies at which the optical information
signals are transmitted and/or received with respective ones of the channels of the
tunable multi-channel device thereat.

13. An optical communication network in which interoperable optical
frequencies are defined without an absolute frequency reference, the network
comprising:

means for distributing a non-absolute frequency reference to nodes of the
5 network; and

at each of the nodes:

a tunable multi-channel device, the tunable multi-channel devices
having channels with mutually-identical frequency differences, and
a control circuit operable to frequency align one of the channels of the
10 multi-channel device thereat with the non-absolute frequency reference.

14. The optical communication network of claim 13, additionally comprising:

at one of the nodes, a transceiver operable to transmit an optical information signal at a frequency aligned with another of the channels of the multi-channel device thereat; and

- 5 at another of the nodes, a transceiver aligned in frequency with the other of the channels of the tunable multi-channel device thereat and operable to receive the optical information signal.

15. The optical communication network of claim 14, in which the transceiver operable to transmit comprises:

- a light source; and
a channel selector operable to align the light source in frequency with the
5 other of the channels of the multi-channel device.

16. The optical communication network of claim 14, in which the transceiver operable to receive comprises:

- a light source;
a channel selector operable to frequency align the light source with the other
5 of the channels of the multi-channel device; and
means, operating in response to light generated by the light source, for selecting an optical information signal for receiving.

17. The optical communication network of claim 13, in which:

the multi-channel device comprises a Fabry-Perot etalon comprising a cavity, the cavity having a length; and

- each of the nodes comprises a control circuit operable to tune the etalon by
5 adjusting length of the cavity of the etalon in response to a feedback signal indicative of a frequency difference between a resonance node of the etalon and the non-absolute frequency reference.

18. An optical communication network in which interoperable optical frequencies are defined without an absolute frequency reference, the network comprising:

a non-absolute frequency reference;
5 a tunable multi-channel device frequency alignable with the non-absolute frequency reference, the tunable multi-channel device comprising channels having stable, defined frequency differences; and
nodes each comprising a transceiver operable to transmit optical information signals and/or to receive optical information signals at one or more frequencies each
10 frequency aligned with a respective one of the channels of the multi-channel device.

19. The optical communication network of claim 18, in which:
the network additionally comprises light sources frequency aligned with the channels of the tunable multi-channel device and operable to generate respective non-absolute frequency reference signals for broadcast to the nodes; and
5 each of the nodes comprises a channel selector operable to frequency align the one or more frequencies at which the transceiver is operable to transmit and/or receive the optical information signals with respective ones of the non-absolute frequency reference signals received thereat.

20. The optical communication network of claim 18, in which:
the non-absolute frequency reference is distributed to each of the nodes;
the tunable multi-channel device is located at one of the nodes;
remaining ones of the nodes each comprise a tunable multi-channel device, all
5 the tunable multi-channel devices having mutually-identical channel spacings; and
each of the nodes comprises a control circuit operable to frequency align one of the channels of the multi-channel device thereat with the non-absolute frequency reference.

21. The optical communication network of claim 20, in which each of the nodes additionally comprises a channel selector operable to frequency align the one or more frequencies at which the transceiver is operable to transmit and/or receive the optical information signals with respective ones of the channels of the tunable multi-
5 channel device thereat.